

nations of the nervules. Underside paler than male, with the cilia of the fore wing black, of hind wing white, with large black spots at the termination of the nervules, and with an anteciliary black line.

Expanse, ♂ $1\frac{2}{5}$ inch; ♂ $1\frac{1}{2}$ – $1\frac{3}{5}$ inch.

Hab. Batchian, March (*W. Doherty*).

Some female specimens have a few blue scales dusted on the disc of the fore wing above.

This species has long been in collections, but I have nowhere seen it described.

IV.—*Contributions from the New Mexico Biological Station.*

—No. 2. *On a Collection of Diptera from the Lowlands of the Rio Nautla, in the State of Vera Cruz.* I. By C. H. TYLER TOWNSEND, F.E.S.

THE following *Diptera* were all collected by the writer, in March, April, June, and July, at San Rafael and Paso de Telaya, on the Rio Nautla, about a mile below and above Jicaltepec, but on the opposite or north side of the river. Paso de Telaya is but two miles from San Rafael, and really forms a part of that settlement. This locality is about four or five miles inland from the coast, and about 30 or 40 feet above sea-level.

Many of the *Diptera* in this collection were taken, from June 26 to July 19, at San Rafael, on flowers of two closely approximated patches of a shrub known by the native name of *barra negra*. It has been determined by Dr. J. N. Rose as *Cordia* sp., probably *C. ferruginea*. Although the flowers of this shrub are small, whitish, and inconspicuous, they were visited by many flies, bees, and other insects. They were about the only flowers in the vicinity from the last of June through July.

A word may be said about the seasons which prevailed during the period of my collecting. There were occasional northers, accompanied by rain, through March and April. No rain fell through May, and not until about June 14, it thus having become very dry, when there came a good rain which lasted two days. After this no more rain fell till July 12, when it rained hard, and continued to rain, some in nearly every twenty-four hours, up to July 20, when I left.

The Lower Rio Nautla region possesses many temperate forms of insects, and therefore comes well within the limits of the *Tamaulipan* fauna. Probably its temperate forms fall short of 25 per cent. of the whole fauna. It is of course,

from its great preponderance of tropical forms, to be classed with the *Neotropical* region proper. The student is referred, for further information on the *Tamaulipan* fauna and the biogeography of the Mexican region, to a paper published by the writer in the 'Transactions of the Texas Academy of Science,' vol. i. pp. 71-96.

The fauna bears some resemblance to that of the Lower Rio Grande region; but the Diptera do not show the resemblance so much as do the Coleoptera and Hemiptera. A considerable number of familiar forms among the more striking species of the two orders last named were collected, which I recognized as having previously taken in the palmetto hammocks near Brownsville, Texas. But these largely represent the tropical or subtropical element of these faunas in the Lower Rio Grande region.

On the whole the Lower Rio Nautla fauna is decidedly tropical in its aspects, especially as regards the Diptera.

The *Cordia* above mentioned was noticed growing, and in flower, July 20 and 21, in places on the road that leads from San Rafael (or Jicaltepec) to Perote, as far up as a point about halfway, or more, between Tlapacoyan and Jalacingo. It was particularly noticed above Tlapacoyan, and up to an altitude, I should say, of 4000 feet or over. In the lowlands it did not seem to me to be so abundant as above Tlapacoyan, but rather of occasional occurrence. It is well to note that it was an extremely good fly-plant.

It may be added that vanilla, coffee, rubber, &c. do well on the Lower Rio Nautla. It is an especially good vanilla country from there north to the Papantla district.

Chironomidæ.

1. *Æcacta furens*, Poey.

Numerous specimens, Nautla, March 5.

This species ranges up and down the Mexican Gulf coast from Tamaulipas to the Isthmus of Tehuantepec, and extends some short distance inland. I have already recorded it from both the north and the south coasts of Jamaica (Journ. Inst. Jamaica, i. p. 381), which was the first record of its occurrence outside of Cuba, where it was originally discovered and described by Poey. I have observed it on car windows in the State of Tamaulipas, near Victoria, in October, it having perhaps been brought thus from Tampico; and I have also noticed it at the mouth of the Coatzacoalcos river.

Dry pinned specimens show the wings to be strongly iridescent in certain lights, the dark and the white spots alike,

as well as the veins and whole wing-surface, especially noticeable being various rich shades of blue and violet. Poey remarks at some length on this peculiarity (Mem. Hist. Nat. Cuba, i. p. 240: Havana, 1851). When the wing is held up to the light and looked through, the dark spots appear faint, excepting only the elongate rectangular black stigma; this can be seen with the naked eye.

Stratiomyidæ.

2. *Sargus*, sp.

One specimen, June 19, San Rafael. Taken from an attid spider which had captured it.

Length 10 millim.

Eyes not contiguous. Front deep metallic green on posterior two-thirds, pale yellowish on anterior third. Thorax and scutellum deep metallic green, with purplish reflection on dorsum. Abdomen black, with hind borders of segments broadly shining violet or purplish. The black of abdomen is soft opaque in some lights, and shining in others. Wings scarcely tinged with fuscous. Legs pale yellowish, middle femora broadly brownish in middle, hind femora blackish except bases and tips, hind tibiæ black on distal half, and hind tarsi blackish except basal half of metatarsi.

Tabanidæ.

3. *Chrysops costatus*, Fabr.

One female, March 16, San Rafael.

Length $7\frac{1}{2}$ millim., not including antennæ.

The eyes in life are green, with brown-black markings. There are four brown-black, rather quadrangular spots on anterior portion of eye, arranged in the shape of a diamond, with the long axis vertical. The posterior spot of the four is longitudinally elongate, occupies very nearly the centre of the eye, and is bisected by a vertical brown-black linear stripe extending from the upper to the lower margin of the eye. The anterior spot is nearly square, while the other two (upper and lower spots) are transversely elongate. In addition to these four spots, there is a vertical bronzed line near posterior edge of eye and parallel with the hind margin, extending from upper to lower border.

Annulate portion of third antennal joint black, the distal part of basal non-annulate portion tinged with blackish. The non-annulate portion of third joint is rather distinctly

constricted, so as to appear like three rings or joints, besides the bulbous base. Frontal callosity not brown on posterior edge, wholly rust-yellow. Outer branch of the two blackish abdominal markings quite obsolete, inner branch reaching anterior margin of fourth segment. Front, face, palpi, and basal joints of antennæ all the same colour, which is a rust-yellow. No lateral brown vittæ on venter. The broad middle band of wings is not straight on distal border but convex; the proximal border is concave, but the small and adjoining cross-veins are well within this border. It agrees with the two Jamaican specimens mentioned by me (Trans. Am. Ent. Soc. xxii. p. 56) in having the hyaline portions of the wings the same as there described. Legs all rust-yellow, tips of tarsi brownish.

4. *Hadrus lepidotus*, Wied.

One female, March 5, on the Estero (a deep inlet from the sea) between San Rafael and Nautla.

Length 8 millim. Others seen but not taken, being difficult to catch.

The eyes in life are red, with green outer border, and two outwardly abbreviated transverse green stripes. The green stripes are bordered and prolonged by a darker red than the ground-colour of the eye.

Agrees perfectly with Wiedemann's description, but the clear apical portion of the wing comprises less than one third of the wing's length, and the whitish border is arcuate, the black being convex on distal border. Anal and fourth and fifth (last two) posterior cells, also axillary portion of wing and alula, hyaline—except that there is a subdetached piece of brown, left by two of the white drop-like spots, in the base of the fourth and fifth posterior cells, and the brown extends into the outer edge of the fourth posterior cell on its apical half, ending on the inner margin of wing in a pointed extension, which occupies about the basal half of second and third posterior cells. On base of wing the black stops short of inner margin of second basal cell. The white drop-like spots are arranged as follows: one on junction of veins at base of second posterior cell, one on small cross-vein, one in extreme base of first basal cell, one each in first and second basal cells before apex and opposite to each other, and two on cross-veins at base of fourth and fifth posterior cells. Scutellum with a coppery-purplish tinge. Middle and hind tarsi white except blackish tips, front tarsi whitish on little more than basal joint (metatarsus).

Syrphidæ.

5. *Nausigaster meridionalis*, sp. n.

One female, July 16, San Rafael. On flowers of the *Cordia* sp.

This specimen seems to agree with those mentioned by Williston from the Isthmus of Tehuantepec (Syn. p. 22) and Chapada in Brazil (Trans. Am. Ent. Soc. xv. p. 259), rather than with *N. punctulata*, Will. Dr. Williston remarks, in the Biol. Centr.-Amer., Dipt. (vol. iii. p. 6), that he believes these specimens to be distinct from the more northern *N. punctulata*, an opinion in which I concur. The species, as represented by my specimen, differs as follows from Williston's description of *N. punctulata*:—

♀. Length 8 millim.

There are four indistinct stripes to be seen on mesoscutum, more shining and greenish than the rest of surface, but they are very hard to distinguish. Checks and lower part of face rather reddish brown, the antennæ being of a lighter shade of same colour. The marking of the wings, which is the principal distinguishing character, is as follows:—The black is all coalesced into one marking, and is more extensive than in any of the specimens mentioned by Williston. Beginning in the third costal cell, at end of auxiliary vein, it widens in passing through the marginal cell, fills out all of the submarginal cell except the apex, and terminates distally by broadly filling the apex of marginal cell. Proximally it continues broadly inward across small cross-vein, following the spurious vein to its end, into base of discal cell, less broadly in base of the last posterior cell, and thence filling out nearly all of second basal cell. It spreads narrowly into first posterior cell on its front border. There is also a narrow streak of black on anterior edge of first basal cell in middle, being in front of spurious vein. Legs reddish brown, with black on base of front femora and on other femora except tips.

6. *Baccha phæoptera*, Sch.

One female, March 30, Paso de Telaya.

Length 13 millim.

It possesses the median linear vitta of mesoscutum in the black between the two pairs of vittæ mentioned by Schiner. The lateral borders of mesoscutum are broadly yellow. A transversely elongate brown spot on sides of thorax below and posterior to humeri. Schiner seems to mistake the first two abdominal segments for one, speaking of them as the first,

calling the third the second, &c. The first segment is wide, short, lunate in shape, and yellow, with hind border broadly dark brown, the brown not extending the full width of segment. Neither arm of the horseshoe-like yellow lateral marking of third segment reaches hind margin, but the arms are equal. On fourth and fifth segments both arms reach hind margin. Sixth segment shows this marking as a small **V** on each side. Third, fourth, and fifth segments show the median linear vitta throughout, but this is only very faintly apparent on the elongate and narrowed second segment. The yellow marking called by Schiner "horseshoe-shaped" is very narrow to be so characterized, and on third segment is rather inverted **V**-shaped. On third and fourth segments it is open behind, but on fifth its arms join on hind margin of segment on one side in this specimen, while on the other side they are open. The facial tubercle is of good size and prominent. Black ocellar spot not shining, opaque. Hind femora pale reddish on more than basal half, with only faint ring of brown before tips. Wings tinged with fuscous yellowish, appearing deep yellow when held up to the light. In Schiner's specimens the wings were doubtless darker. I give these detailed comments on Schiner's description, so as to assist in the determination of the species in the future.

7. *Ocyptamus fuscipennis*, Say.

Three female specimens, March 2 and 23, San Rafael; and April 7, Paso de Telaya.

Length about 8 millim.

The white of face does not extend on sides of front. Face hardly yellowish in one specimen. All the tarsi reddish yellow in two specimens, and only hind tarsi faintly tinged with brownish in the other. Black of wings not at all diluted in anal, last posterior, and discal cells in one specimen, and but very slightly in the other two.

8. *Volucella obesa*, Fabr.

One male, July 18, San Rafael. On flowers of the *Cordia* sp.

9. *Eristalis ornatus*, sp. n.

Two males, July 10, San Rafael. On flowers of the *Cordia* sp.

♂. Length $10\frac{1}{2}$ to 11 millim.

Near to *E. ochraceus*, from Williston's description of which (Trans. Am. Ent. Soc. xv. p. 279) it differs as follows:—There

is more or less black pile mixed with the yellow on frontal triangle. First abdominal segment silvery whitish in middle. Linear brown stripe of second and third segments almost obsolete. There is hardly any dark anterior margin perceptible on second segment. The third and fourth segments are the same colour as the second, but they each have an entire shining cross-band which the second lacks. Fifth segment black. Legs rather deep reddish yellow, with proximal half of middle and front tibiae yellowish white. Hind femora narrowly and faintly brownish on distal ends above. Tarsi wholly reddish yellow, distal half of foot-claws black. Wings pure hyaline, except a small well-defined subquadrate dark brown or blackish spot at end of auxiliary vein, between latter and first vein. Wing-veins pale yellowish. Tegulae light buff-yellow, with a fine long yellow silken fringe on border; alulets faintly fuscous, with a ciliate black fringe.

10. *Meromacrus crucigerus*, Wied.

Seven males and five females, San Rafael. A small female, March 16; the others July 1 to 18, on flowers of the *Cordia* sp.

Length $11\frac{1}{2}$ to 15 millim.

The ground-colour of the small female taken in March is black, except two reddish oval lateral spots on second segment anteriorly. In this specimen also the facial stripe and frontal vitta are more or less blackish. All the others belong to the form mentioned by Williston in the Biol. Centr.-Amer., Dipt., from Sonora and Teapa. The ground-colour of abdomen is reddish brown, hind femora blackish or brown except at distal end. Two of the females (July 9 and 18) have the posterior segments of abdomen a little darker, and all of the four females taken in July have the frontal vitta blackish only on posterior two-thirds. They all, however, as well as the males, have the facial stripe reddish. Frontal triangle in the males, and anterior one third of frontal vitta in the females, reddish. In all the males except one the pile on sides of frontal triangle is whitish instead of yellow. Pile of sides of front and face in female very deep yellow, like the pile of thoracic and abdominal markings. These latter markings agree perfectly with Williston's description (Syn. p. 180). Middle of first abdominal segment, and narrow concave front border of second, opaque black. A more or less distinct blackish tinge to other segments, leaving a pair of large reddish lateral lunate triangles on second segment.

Conopidæ.

STYLOGASTER.

Fifty-one specimens of this interesting genus were taken hovering over the front ranks of a moving army of ants, in a *cafetal* at Paso de Telaya, during the last hour or two of daylight on March 29. In company with them were numerous specimens of *Hyalomyia* and some other small tachinids. The ants have been determined by Mr. Theo. Pergande as *Eciton Foreli*, Mayr. Mr. Pergande adds that they are the most northerly form of that species, which is a widely distributed one in the American tropics. The column of ants was about 15 feet wide and 25 feet long, and moved slowly but surely in a straight line through the *cafetal*, swarming rapidly over the thick covering of dead leaves, branches, and other obstructions that strewed the ground under the coffee-trees. The specimens of *Stylogaster* hovered continually over the ants, now and again darting at them, without doubt for the purpose of ovipositing in their bodies. During the whole three months of my collecting in this locality, I saw not a single specimen of *Stylogaster* at any other time; but on this occasion, during the short time that I had before dark overtook me, I succeeded in capturing fifty-one specimens, by sweeping closely with the net over the front ranks of the ants. These fifty-one specimens belong, strange to say, to three new species, all distinct from *biannulata*, Say, and *neglecta*, Will., the only species hitherto known from America. The genus has never before been recorded from Mexico or Central America. No specimens were contained in the Biol. Centr.-Amer. collections, as evidenced by the genus not being mentioned by Dr. Williston in his treatment of the Conopidæ.

Williston has stated (Trans. Conn. Acad. 1885, p. 389) that this genus, "it is thought, may be parasitic upon termites." However this may be, I believe that my observations, as above detailed, leave no doubt that the three species described below are parasitic upon ants of the genus *Eciton*, in the State of Vera Cruz.

Such a series of specimens as the present could not fail to throw some light on the confusion existing with regard to the described species, and especially to the specimens described by Wiedemann, although I think that Dr. Williston has presented the latter question in its true light in his most recent paper on *Stylogaster* (Kans. Univ. Quart. i. pp. 120-122). I believe there is no doubt that Wiedemann had two, and perhaps three species before him, one of these

being *neglecta*, Will. It is equally certain that Fabricius's name *stylata* must be dropped for the present, from the utter uncertainty as to what his species was, since the relative length of the antennal joints is not mentioned in his description, and the antennæ are apparently absent in the type, while it is known that the abdomen is wanting. Thus it would be futile for me to attempt to define it in the synoptic table of species given below. It is barely possible that an examination of the type, though so badly mutilated, might place it, providing it could be found. Judging from Fabricius's description, I believe it possible that his species *stylata* may be distinct from any described, including those in this paper.

In the light of my material, I am inclined to think that the male specimen described by Dr. Williston as *biannulata*, Say (Trans. Conn. Acad. 1883, p. 7), is distinct from that species, as the descriptions differ on the colouring of the front in a way that can hardly be mistaken, especially since the fifty-one specimens of my three species show absolutely no variation in this regard.

*Synoptic table of the American species of Stylogaster
so far known.*

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|--|--------------------------|
| 1. Second antennal joint short, about as long as broad,
third joint strongly elongate | <i>neglecta</i> , Will. |
| Second joint elongate, nearly or quite as long as
the third | 2. |
| 2. Mesoscutum with the lateral borders broadly pale
yellow, rarely indistinctly so; front rufous
yellow anteriorly | 3. |
| Mesoscutum with only the humeri pale yellow, front
wholly without yellow anteriorly | 4. |
| 3. Abdomen with a distinct median vitta (rarely sub-
obsolete), widened into a triangle on base of
second segment | <i>stylosa</i> , sp. n. |
| Abdomen without such vitta | <i>biannulata</i> , Say. |
| 4. Large species with prevailing colour blackish, hind
tibiæ and ovipositor conspicuously silvery white
before tips, silvery of face extending on sides of
anterior half of front | <i>ethiopa</i> , sp. n. |
| Small species without white on hind tibiæ or ovi-
positor, and with front wholly blackish or brown
to antennal pit | <i>minuta</i> , sp. n. |

11. *Stylogaster stylosa*, sp. n.

Eight female, and six male specimens.

♂ ♀. Length of female nearly 5 to over 6 millim., not including ovipositor, which is $2\frac{1}{2}$ to 3 millim. Length of male $6\frac{1}{2}$ to 8 millim.

Very similar to *S. biannulata*, Say, as shown by Say's

description, but differing in the very constant character of the median abdominal vitta. Face wholly silvery; the anterior half (or more than one third) of the front rufous yellow, with the silvery of face extending narrowly on sides of this yellow portion and ending in a point on each side. Rest of front soft opaque black, except the shining black ocellar area. First antennal joint light yellow, as is base of second; rest of antennæ rufous, the third joint being more or less tinged with fuscous on upper edge and tip; arista blackish. Second antennal joint in all the specimens fully as long as third, or even sometimes appearing very slightly longer; base of third joint about same width as apex of second. Proboscis of ordinary length for the genus, each of the two joints about 3 millim. long, broadly whitish on tip, yellowish at base, with more or less of a silvery-white reflection. Mesoscutum blackish, with humeri and broad lateral borders yellow (in one specimen darker at base of wings), the yellow also continuing around hind margin and extending anteriorly in a median pair of short vittæ nearly to transverse suture, each vitta terminating in a point, which is connected by a usually distinct line with the yellow of the humeri. The suture is also marked, especially on lateral sections, with a faint yellow line. In fact the thorax might be described as yellow, with three heavy closely approximated black vittæ on dorsum; the middle vitta widest, beginning on extreme front border of thorax and ending in a point (sometimes faint) at scutellum; the lateral vittæ strongly abbreviated in front, their outer borders convex, and ending rather pointedly behind at scutellum. Sides of thorax silvery pollinose, with a faint or nearly obsolete touch of brownish below and a little before wing-bases, the brownish with shining surface. Scutellum pale yellowish, brownish on disk. Abdomen yellowish; first segment more or less brownish on dorsum, sometimes as a posterior margin, sometimes as a geminate marking indented on middle in front; second to fifth segments brown or blackish on posterior margin, the fourth and fifth sometimes with a dark tinge on anterior portion, and always more or less distinctly silvery-white pollinose on all except the brown hind border; a distinct (in one female only is this indistinct) median brown vitta on second to fifth segments, dilated into a triangle on second segment, the base of the triangle being coincident with front border of segment. Abdomen thinly clothed with short black hairs. Ovipositor of female hardly as long as abdomen, composed of two segments: first segment usually longer than second including the appendages of latter, with more or less brown or blackish on dorsum; second segment

more uniformly brown or blackish, darkest on dorsum, sometimes yellowish on underside. Appendages of ovipositor are as follows:—The underside of second segment at its tip is extended into a long, narrow, sheath-like point, considerably shorter than segment itself; an elongate, spatulate, but sub-equilateral, palpus-like organ, clothed with black hairs, proceeds from tip of second segment and lies along upper surface of this sheath, being about equal in length with the latter; at base of spatulate organ, and apparently springing from second segment, are two short palpi-form organs also clothed with black hairs. These appendages are all more or less yellowish or rufous. In some specimens the sheath seems to be split obliquely lengthwise on each side, forming three pieces, and the side pieces, which are rather slender, are sometimes hard to distinguish on account of their lying closely against sides of spatulate organ; in such cases the sheath-like point of ovipositor seems very short, not nearly the length of the spatulate organ. Front and middle legs light yellow, the tarsi more or less blackish except metatarsi; hind legs as described for *biannulata*, the hind femora (as in all species known to me) biannulate with blackish; hind tibiae with a narrow, rarely faintly silvery ring on middle, distal two fifths of hind tibiae and all of hind tarsi black. Wings evenly infuscated, halteres fuscous except the yellowish stalks. Abdomen of male widened and blunt at end, with six visible segments, the sixth blackish on sides; a tuft of yellow hair on underside of abdomen at tip. Hind femora of male with the brush-like black hairs on underside at base; hind tibiae only slightly bent, sometimes hardly perceptibly so. Hind tibiae swollen on distal half in both sexes, more so in the male.

Wiedemann seems to have had this species before him when he wrote his description of *S. stylata*, Fabr., for he describes exactly the median longitudinal vitta of abdomen with its triangular expansion on second segment, stating that some specimens possessed this.

12. *Stylogaster ethiopa*, sp. n.

Twenty female specimens, none of the other sex whatever.

♀. Length 7 to 8 millim., without ovipositor; latter 4 to $4\frac{1}{2}$ millim.

Face yellowish, silvery pollinose; silvery extending on sides of front and ending in a point on each side before reaching occipital margin; rest of front opaque blackish, except the large, triangular, shining, black, ocellar area. Antennae blackish, reddish on underside of third joint.

Proboscis quite strongly elongate, very distinctly more than in *S. stylosa*, each of the two sections being 5 millim. long in the largest specimens, making whole length 10 millim., not including the base; each section 4 millim. in small specimens. Proboscis white at tip, yellowish at base. Thorax black above, except the pale whitish humeri; on sides whitish, with a broad fascia of black extending from dorsum, between humeri and base of wings, down to base of middle coxæ. Scutellum black, faintly pale yellowish on lower edge. Abdomen black, a half-round whitish-yellow spot on each side at base of segments two to five. These spots are clothed more or less with whitish pile, especially on their anterior portions, and are largest on the third and fourth segments, but occupy less than half the length of the segment. Ovipositor elongate, somewhat longer than abdomen, composed of two segments; basal segment about one third longer than terminal, black, with base yellow; second segment black, yellowish at base and clothed with white hair on its basal half, thus giving the ovipositor its conspicuous silvery-white ring before tip. Appendages of second segment of ovipositor same as in *S. stylosa*, except that the under sheath-like extension is short and rather more blunt at tip, being only one half or one third the length of spatulate organ, and the parts are blacker. The spatulate organ and the two palpi-form organs at its base are rather thickly clothed with longer black hairs, the former from a side view looking like a feathery or short-plumose arista. Front and middle legs pale yellow, finely short black-hairy, the coxæ whitish and mostly bare, the bases of femora blackish, those of middle femora more broadly so; tibiæ whitish and white-hairy except on outer side of proximal two fifths; the tarsi tinged with brownish and thickly clothed with short black hairs; hind legs black, the coxæ shining black and appearing seed-like on posterior surface, the femora broadly pale yellowish at each end and with a whitish or pale yellowish ring in middle; the tibiæ with a broad white ring clothed with white hair just before tips. Wings evenly infuscated; halteres fuscous except the rufous-yellow stalks and bases.

13. *Stylogaster minuta*, sp. n.

Seven female specimens and ten males.

♂ ♀. Length of female 4 millim., not including ovipositor; length of latter 2 millim. Length of male 5 to 5½ millim.

This species, save for its small size, looks at first sight very much like *S. stylosa*, but differs from it in the following characters, which are very constant:—Front wholly brown

or blackish to base of antennæ, the front border of the brown being perfectly concave-semicircular, as limited by the posterior edges of the pit or hollow in which antennæ are inserted. Each of the two joints of proboscis 2 millim. long; base of proboscis a little more broadly yellowish and with silvery-white reflection. Mesoscutum shining blackish, without lighter lateral border, only humeri whitish, the black of dorsum extending in a dilute fascia halfway to middle coxæ, the rest of sides of thorax being whitish. Scutellum blackish. Abdomen without median vitta, but blackish or brown, with second and third segments more or less broadly whitish yellow on bases, usually leaving on third segment a median brown triangle and on second segment a triangle with a median geminate or entire spot-like dilatation at anterior angle. Fourth segment more or less yellowish laterally on base, often in female almost wholly black, quite constantly in male rather broadly yellowish; the fifth segment with less yellowish on base than fourth. Ovipositor of female blackish, yellowish at base; appendages yellowish and with the two palpus-like organs more elongate. Hind femora biannulate with blackish. The pale yellowish of hind legs more or less tinged with brownish, and especially on the tarsi and distal half of tibiæ, which appear dusky. Tip of male abdomen usually blackish, with the yellowish hair inconspicuous. The brushes of long black hairs on underside of bases of hind femora in male are comparatively better developed than in *S. stylosa*, and the hind tibiæ are more distinctly bent.

Tachinidæ, sens. lat.

14. *Acaulona costata*, v. d. Wulp.

Acaulona costata, v. d. Wulp, Biol. Centr.-Am., Dipt. ii. p. 4.

Two specimens, male and female: the male, April 8, Paso de Telaya; the female, July 12, San Rafael, on flowers of the *Cordia* sp.

Length of female 5 millim., of male fully 6 millim.

After examining the genitalia of both of my specimens, I believe that v. d. Wulp's specimens are the female. The front is the same width in both sexes. The male has the claws and pulvilli elongate, about twice as long as in female. The male has the elongate-oblong, somewhat flattened abdomen characteristic of the males of *Trichopoda*. It is not widened in middle, but is of equal width except for the gentle narrowing of last two segments and rounding off of anal segment. It is but slightly narrowed at base. The female abdomen is ovate, convex, more narrowed at base, and

widened on second segment. The foot-claws and pulvilli in my female are not particularly short, but are as long as last tarsal joint. The colouring of abdomen differs in male by having the brownish triangles of segments more narrowed behind, less spreading, and forming a more distinct median stripe, especially on first segment.

My specimens differ as follows from v. d. Wulp's description:—Antennæ somewhat more than half the length of face, third joint hardly twice as long as second. First abdominal segment of female longer than second or third, or even fourth, which latter is longer than either second or third, these two being about equal. Second, third, and fourth segments of male about equal, but little shorter than first, the fifth segment about two thirds length of fourth. (Above are from comparison with the generic characters.) Antennæ of male brownish, of female largely fulvous. Markings of thorax pale golden, alike in both sexes. Scutellum fulvous on border. Mesoscutum bordered broadly with golden behind the suture as well as before it. Dark markings of abdomen pale brownish. Fourth abdominal segment in female with the brown fainter than on the other segments. Fourth segment in male mostly brown. Genitalia hardly darker than the fulvous of anal segment. Front femora in female with but very little yellow at base, middle femora rather narrowly and hind femora more broadly yellow. In male front femora are narrowly yellow, but middle and hind femora have basal half to two thirds yellow. The differences in the foot-claws of the two sexes are exactly similar to those in *Trichopoda*. In the male the claws are elongate, wholly of a pale tawny or brownish yellow, and straight; in the female they are shortened, abruptly curved at end so as to be hook-shaped, and the hook-like tips are abruptly black.

I believe that the two appendages of anal segment, figured and described by van der Wulp, belong to the female genitalia.

15. *Trichopoda tegulata*, sp. n.

One female, July 1, San Rafael. On flowers of the *Cordia* sp.

♀. Length 8 millim.

This beautiful species is very easily distinguished from any so far described. It is entirely black except as follows:—Face silvery-white pollinose, extending upon sides of front as far as middle. Checks and occiput with a cinereous silvery bloom, extending over sides of thorax and coxæ. Transverse suture of thorax marked by a deep gold line, widened and spot-like at ends. Two golden vittæ of same width as that

on transverse suture, linear, extend from anterior margin of thorax to transverse suture, are parallel, and divide the black of mesoscutum in front of suture into three portions of exactly equal width. Wings entirely black, except the hind border, which is hyaline. Pulvilli pale yellowish white; foot-claws pale yellow, with black hooked tips (female). Halteres pale yellowish, more reddish at base. The character from which I have named the species, and which is so striking that it will distinguish it at once, is the colour of the tegulæ and alulets. The tegulæ (lower pair of scales) are large and wholly of a deep golden-yellow colour, being very conspicuous against the black of the body and wings, while the alulets (upper pair of scales, appearing like an upper and smaller pair of tegulæ), which cover the forward portion of the yellow tegulæ, are pure white on the anterior half and abruptly black on posterior half (the wing being understood to be directed backward in the usual position). Such a beautiful effect in coloration of the tegulæ and alulets I have never before seen in any fly.

Note.—What I have called the alulets (the upper or smaller pair of scales) are not true tegulæ, but appear so when the wing is flexed or directed backward in its usual position. When the wing is extended strongly forward it is seen that this smaller scale is a part of it, being borne on the extreme base of the inner edge of the wing, proximad of the alula, which in turn is proximad of the axilla (anal or axillary angle) of the wing. It should be known as the *alulet*, which is the diminutive of alula. I think that this term is deserving of use and should be adopted. Beginning, then, with the axillary angle of the wing, the latter being extended forward to its utmost, and proceeding inward or proximad, we have in order the *axilla*, *alula*, *alulet*, and *tegula*. I remark here upon these points of terminology in detail, as no writer seems ever to have paid any attention to the distinctions to be made in the application of the last three of these terms.

Since the above was written Dr. Williston has called attention, in his new synopsis of *Diptera* just published, to the fact that Osten Sacken has proposed the name "anti-tegula" for the upper pair of scales. I think "alulet" is a preferable term, from the fact that it is a short word and has long been in use, notwithstanding that it has been indefinitely applied in some cases.

While on the subject of *Trichopoda*, I wish to propose the name *T. subalipes* for the species described by me from Santo Domingo under the name of *T. subciliipes* (Journ. N. Y. Ent.

Soc. ii. pp. 78, 79). The latter name is preoccupied by Macquart for a species described by him from Guiana.

16. *Cistogaster immaculata*, Macq., sens. str.

Cistogaster immaculata, Mac., sens. str., nec Towns. Trans. Am. Ent. Soc. xxii. p. 67.

One male, March 18, San Rafael.

On pages 66-67 of the Trans. Am. Ent. Soc. xxii. (1895) I gave detailed notes of my own on two forms among the females of what had previously been known as *Cistogaster divisa*, Lw. I also presented some interesting notes sent me by Mr. Charles Robertson on the separation of the males and possible connexion of the two series of the latter with the two female forms. I am inclined now to adopt this view, and thus consider these two series as distinct species. The remarks that I made at end of page 67 on the names to be used for the two forms should be corrected. Since writing those remarks I have found that Macquart described the male of the "dimorphic" female, while Loew described the male of the "normal" female. Therefore the species possessing the "dimorphic" female will be known as *C. immaculata*, Mcq., and that possessing the "normal" female will be known as *C. divisa*, Lw. Walker's name *occidua* will remain a synonym of the latter.

The present male specimen belongs to *C. immaculata*, Mcq., being the male form in which the median longitudinal fuscous stripe of abdomen is wanting, which male should be connected with the "dimorphic" female. Macquart's description leaves no doubt on this point, as he says of the abdomen "une ligne dorsale de reflets d'un blanc jaunâtre." He describes the abdomen as ferruginous, the first segment with a small dorsal triangular black spot, and the third segment with yellowish-white pollinose reflections on each side. My specimen has the median pollinose line and the pollinose surface on each side of third segment golden instead of yellowish white. The fourth segment is tinged with darker and the golden pollinose covering extends over nearly the whole of it. The deep golden yellow of sides of front extends fully halfway down the sides of face. The whole mesoscutum and scutellum are deep golden pollinose, the former with median pair of linear darker vittæ in front of transverse suture and an outer heavier vitta on each side not reaching front margin and broadly interrupted by suture.

Length nearly 6 millim.

17. *Penthosia satanica*, Bigot.

Penthosia satanica, Bigot, van der Wulp, Tijdschr. v. Ent. xxxv. (1892) pp. 189-190.

One male, July 4, and two females, July 5 and 6. San Rafael, on flowers of the *Cordia* sp.

Length of male $10\frac{1}{2}$, of females $11\frac{1}{2}$ millim.

The frontal bristles extend well below the antennæ, but there is no row of hairs on each side of face except these. The first and second antennal joints are about equal, taken together they are about as long as width of front at vertex; the third joint is greatly elongated, being four or five times as long as the second, which is not by any means very short. In the male especially the third joint is widened distally and is subtruncate at tip. Arista nearly as long as third antennal joint. Thorax is not "densely pilose," but whole thorax, abdomen, and legs are well and quite thickly clothed with short hair. The only long macrochætæ are on the scutellum. Foot-claws of male long and nearly straight, of female shorter and hooked at tip. The only light colouring on this entire insect is the silvery-white pollinose stripe extending from middle of front on each side down to cheeks. It is interrupted below base of antennæ. Even this looks blackish in certain lights. Otherwise the entire insect is black, even to the pulvilli and wings, the latter, however, having a purplish lustre.

18. *Saundersia rufopilosa*, v. d. W.

Saundersia rufopilosa, v. d. W., Biol. Centr.-Am., Dipt. ii. p. 22.

Two male specimens of this beautiful species, San Rafael, March. Heretofore recorded only from Guatemala and Costa Rica.

Length 11-12 $\frac{1}{2}$ millim.

First two antennal joints rufous. Mesoscutum deep golden pollinose, rather than cinereous. I should certainly call the frontal bristles strong, not "rather weak." Pilosity of occiput deep golden yellow. Second and third antennal joints same length. Pilosity of mesoscutum short, black. The three black dorsal spots of abdomen, on median line of second, third, and fourth segments, not coalesced, entire. Bristles on coxæ and underside of femora either wholly yellow or wholly black. Alulets golden fulvous, the tegulæ faintly tinged with fuscous.

19. *Belvosia bicincta*, R. D.

One female, July 16, San Rafael. On flowers of the *Cordia* sp.

Third antennal joint hardly twice as long as second. Facial ridges not ciliate, with some bristles not extending halfway up.

Length 15 millim.

20. *Belvosia bifasciata*, Fabr.

One female, June 20, San Rafael.

Third antennal joint three or more times as long as the second. Facial ridges ciliate, with strong bristles extending up to a point opposite lowest frontal bristles.

Length $11\frac{1}{2}$ millim.

I am aware that Dr. Williston has shown that there is great variation in these two forms of *Belvosia*, and that intergradations of all kinds exist. I think it is well, however, to apply the two names and differentiate the forms when they can be separated. When specimens are encountered which cannot be so separated they should be mentioned individually, with details as to their variation from the typical form.

21. *Phasiopteryx Bilimeki*, B. & B.

One male, March 9, San Rafael.

Length 7 millim.

This specimen seems to be more robust and bristly than van der Wulp's specimens described in the Biol.-Centr. Am., Dipt. It differs as follows from van der Wulp's description of *Neoptera* (Biol. Centr.-Am., Dipt. ii. pp. 165-166):—The frontal bristles are not hair-like. There is a pair of short decussate vibrissæ. The bristles on third and fourth abdominal segments can certainly be properly called macrochætæ. The wings agree well with description, except that the curvature of fourth vein does not form a right angle, but is rounded. Apical cross-vein is a little concave. The foot-claws and pulvilli are not short, but rather elongate. Claws black, pulvilli yellow-fuscous.

Van der Wulp's figures of male wing (Biol. Centr.-Am., Dipt. ii. pl. iv. figs. 11, 11 a) show the third vein altogether too strongly arcuate in 11 a, hardly enough so in 11, and, especially in the latter, with a too much narrowed apical cell, to agree with my specimen.

Although the vibrissæ are so distinct and the bristles all

so much stronger than indicated by van der Wulp, there is no doubt that the present specimen is the same species, as the peculiar wing-characters cannot be mistaken. The generic characterization must be changed somewhat, however, especially as regards the presence of distinct vibrissæ.

Dexiidæ.

22. *Euantha dives*, Wd.

Euantha dives, Wd., v. d. Wulp, Biol. Centr.-Am., Dipt. ii. p. 249.

Two males, March 6 and 16, San Rafael. They differ from v. d. Wulp's description only as follows:—

Subtrigonal spot of cheeks brownish, not well defined. Coxæ reddish yellow. Tegulæ pale, with yellowish tinge.

Length $12\frac{1}{2}$ millim.

In v. d. Wulp's synoptic table of Dexiidæ, in the Biol. Centr.-Am., Dipt., he puts *Euantha* in section without costal spine on wings. *E. dives* certainly bears a spine on costa just before end of auxiliary vein. He also makes synopsis read for *Euantha* "wings unicolorous," which is evidently a typographical error. I am sorry to find that I inadvertently perpetuated these errors in my synopsis of Dexiidæ in Trans. Am. Ent. Soc. xix. p. 275. The table there given should be corrected in accordance with the above.

V.—The Classification of Oribatidæ.

By A. D. MICHAEL, F.L.S.

A PAPER by Dr. A. C. Oudemans has appeared in the Tijdschr. voor Entomologie entitled "List of Dutch Acari, Latr., first part Oribatei, Dug., with synonymical notes and other remarks." It is always a pleasure to acarologists to see a paper by Dr. Oudemans upon the creatures which they study, and more especially so when the paper is written in a language more familiar to most biologists than Dutch is. This paper is chiefly upon the Oribatidæ, and is, in many respects, very useful; but as it seeks to make numerous changes in the nomenclature of genera, species, anatomical parts, &c., and in classification, I shall probably be expected to answer it. This I will endeavour to do so far as I think the paper requires an answer.

Firstly, I may fairly congratulate Dr. Oudemans on his knowledge of the English language, in which the paper is written.